

**REMARKS**

Claims 1 - 11 are pending in this application. Favorable reconsideration of this application, as presently amended, and in light of the following discussion, is respectfully requested.

**Claims 1-11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Covington, et al. (U.S. Patent No. 4,502,938, hereinafter "Covington"), in view of Applicants' admitted prior art (hereinafter "APA").**

Applicants respectfully traverse the 35 U.S.C. §103(a) rejection of claims 1-11, for the reasons described below:

**Covington**

Covington teaches a modification of conventional ISFET structure, but fails to teach or suggest any Tungsten Oxide formed overlying the gate oxide layer.

**Applicants' related art**

Inasmuch as the Examiner takes the general description in the Background of the invention as "Applicants' admitted prior art" ("APA"), the Applicants must regard what is mentioned in the "Description of the prior art" as a whole as prior art in the following discussion.

**As a whole**

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). In addition to what is cited by the Examiner, the APA also discloses that "Currently, the WO<sub>3</sub> layer can be formed by E-beam evaporation, DC or AC sputtering, thermal evaporation, vacuum evaporation, and CVD.", "The composition and structure of the WO<sub>3</sub> layer will directly affect its resistivity and electrochromic property, thereby the properties of the devices are determined by the composition and structure of the WO<sub>3</sub> layer.", and "In general, the composition of the WO<sub>3</sub> layer is hard to be controlled regardless which method is used. For example, the composition of the WO<sub>3</sub> layer made by vacuum evaporation is hard to be controlled, thus the surface of the WO<sub>3</sub> layer is not uniformed."

**Product by Process**

The APA has pointed out that physical and electric characteristics, e.g. crystal lattice status and resistivity, of WO<sub>3</sub> do in fact vary with fabrication methods. That is, different types of WO<sub>3</sub> layers are formed with different fabrication methods.

To support this, the inventor further provides experimental data regarding a-WO<sub>3</sub> formed by vacuum evaporation and RF-sputtering as shown in Attachment I. FIGs. I and II, i.e. FIG. 10 of the application drawings, show IDS-VGS curves for ISFETs with a-WO<sub>3</sub> gates formed by vacuum evaporation and RF-sputtering, respectively. FIGs. III and VI, i.e. FIG. 9 of the application drawings, show IDS-VDS curves for ISFETs with a-WO<sub>3</sub> gates formed by vacuum evaporation and RF-sputtering, respectively. It is obvious that the response scale and tendency of the electrical characteristics of ISFETs are very different although they are all equipped with a-WO<sub>3</sub> layers as

gate layers formed by different methods, which means a-WO<sub>3</sub> layers vary with how they are fabricated.

Both the APA and experimental data provided by the Applicant prove that the products, a-WO<sub>3</sub>, vary with fabrication processes, such as vacuum evaporation or RF-sputtering. Accordingly, the products, ISFETs, also vary with how the a-WO<sub>3</sub> is fabricated.

### **Obvious to try**

"The admonition that 'obvious to try' is not the standard under 35 U.S.C. §103 has been directed mainly at two kinds of error. In some cases, what would have been 'obvious to try' would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful. In others, what was 'obvious to try' was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it." In re O'Farrell, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988)

### **Reasonable expectation of success**

Although the Examiner asserts that the combination of the two citations would lead one with ordinary skill in the art obvious to try, it does not render the claimed invention obvious. There is no teaching or suggestion in APA of which method will be the most promising solution to fabricate an amorphous WO<sub>3</sub> layer satisfying the requirements for a sensing gate layer in an ISFET device. APA does not teach or suggest any reasonable expectation of success among those fabrication

methods. There is no information for those ordinarily skilled in the art to infer from the APA that the a-WO<sub>3</sub> formed by RF-sputtering is more likely than a-WO<sub>3</sub> formed by the other methods to be profitable for ISFET devices. In fact, according to what is addressed in the APA, there might be also the possibility that none of the known fabrication methods could form a working a-WO<sub>3</sub> layer for a working ISFET device.

According to Figs. 6-11, the superior sensitivity and stability of the RF-sputtered amorphous WO<sub>3</sub> gated ISFET in various aqueous samples are shown, which indicates that amorphous WO<sub>3</sub> formed by RF-sputtering as claimed is uniform and qualified in electric characteristics as a sensing gate material of the ion sensitive field effect transistor (ISFET).

### **Conclusion**

As Covington and APA, neither alone nor in combination, teach or suggest a reasonable expectation of success to make the claimed invention, the claimed invention is non-obvious in view of the cited references. Accordingly, Applicants submit that claim 1 sets forth allowable subject matter. Since claims 2-11 depend from claim 1, Applicants further submit that these claims are also allowable.

In view of the remarks set forth above distinguishing the claimed invention from the cited prior art references, Applicants submit that the Examiner's rejections have been overcome. It is therefore respectfully requested that the Examiner withdraw the rejections and allow the present claims.

CHOU, et al.

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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees which may be due with respect to this paper, may be charged to Deposit Account No. 50-2394.

Respectfully submitted,

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